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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/550,331	04/14/2000	Tatsuya Tanaka	0023--1785-3	8740

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EXAMINER
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TRAN, LEN

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application N .

09/550,331

Applicant(s)

TANAKA ET AL.

Examiner

Len Tran

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 3,4,6-18 and 20-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3,4,6-18 and 20-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 3, 4, 7-9, 16, 17, 21-23, 24, and 25-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 01166874, and further in view of Wang (US 5,501,266) and further in view of Kono (US '372) and **Kono (US 6,135,196) and JP 1-92447.**

As to claims 3, 7-9, 17, 21-23, and 24, JP '874 discloses an injection molding apparatus comprise of a chamber, an extrusion screw located substantially vertical, a cooling unit, a connection member having a first internal channel in a vertical direction and a second channel in a horizontal direction, a nozzle at the end of the connection member, a hopper, and a clamping

Art Unit: 1725

device for the plates (figures). The screw extruder is in an axial direction and the plunger in the horizontal position.

JP '874 discloses the claimed invention above, but fails to teach the joined portion is rounded, screw compression ratio is 1, and the screw segments has higher temperature creep strength to resist the molten metal. JP '874 also fail to disclose the screw to move linearly in a substantially vertical direction.

However, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to have a compression ratio of 1, since the related arts teach extrusion resulting in compression of the molten metal. Therefore, it would have depended on the design expediency and regarding to time constraint, increasing or decreasing compression ratio would result in fast or slow production of the metal product.

In addition, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have a compression ratio of 1, since it has been held that an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Furthermore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the shaft of high creep temperature and the screw extruder of high melting point *than the molten metal* in order to prevent the screw from melting and the shaft of the screw from deforming during rotation.

Wang et al disclose *the screw vertically structured and linearly moved in order to displace the molten metal into the casting mold (col. 4, lines 63-67).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a screw linearly moved in a vertical direction as taught by Wang et al, in JP '874, in order to inject the molten metal into the casting mold.

As to claims 4, 16, 25-35, JP '874 discloses the claimed invention above, but fails to teach the joined connection to be rounded, and a valve at the first channel and second channel *and a nozzle discharge port opening/closing means for opening or closing a discharge port of the nozzle.*

However, Kono discloses a rounded joint between the first and second channel with a valve (60) in order to prevent molten metal from flowing backwards to the first channel. *In addition, Kono discloses a ball valve (60) to thereby close off fluid communication between the barrel (30) and the accumulation chamber (50) (col. 4, lines 3-15).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to a rounded joint and a valve as taught by Kono, in JP '874 and Wang et al, in order to prevent backflow of the molten metal.

**As to the new limitation in claims 25, 25, 28, 32 and 34, regarding to the “supplying molten metal to a hopper while controlling the height of the molten metal in the hopper” is rejected, since JP 1-192447 discloses supplying molten metal from holding furnace (1) to a hopper (3), then to the extruder for the purpose of supplying while holding the thixotropic property at low cost.**

Art Unit: 1725

**In addition, Kono (US 6,135,196) discloses a sensor (22) for the purpose of measuring the amount of metal inside the hopper.**

**Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide JP '447's molten metal dispensing apparatus with the sensors of Kono, in JP '874 in order to supply molten metal to the hopper while monitoring the amount of molten metal inside the hopper.**

4. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '874, in view of Wang et al, in view of Kono (US '372) as applied to claim 25 above in paragraph 3, and further in view of Rock (US 3,773,098).

JP '874, Wang et al and Kono disclose the claimed invention above, but fail to mention a static mixer disposed in the nozzle. Kono discloses a heating member disposed at the periphery of the nozzle for setting the temperature of the light metal for forming a solid plug (col 4, lines 46-57), but fails to disclose a static mixer in the nozzle.

Rock discloses a static mixer with stirring blades connected in front of a nozzle (figure 4, col 1, lines 23-33) for the purpose of having efficient and uniform mixing at the nozzle prior to the mold for producing the final product.

Therefore, it would have been obvious to one of ordinary skill in the art to provide a static mixer as taught by Rock, JP '874, Wang et al, and Kono because it allows efficient and uniform mixing prior to molding.

Art Unit: 1725

5. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '874 and Wang et al as applied to claim 25 above in paragraph 3, and further in view Mercer, II et al (US 5,388,633).

As to claims 18 and 20, JP '874 fails to disclose a melting furnace for heating the solid material into molten metal and a supply unit for supplying the molten metal in the melting furnace by way of a supply pipeline shielded with an inert gas to the hopper; a level sensor for detecting the surface height and a control device for controlling the amount of the molten metal supplied to the hopper based on the signal from the level sensor.

Mercer, II et al discloses a melting furnace (10) for heating molten metal and being located substantially at the identical ground level with that of clamping device (68), and a molten metal supply unit for supplying the molten metal in the melting furnace (10) by way of a supply pipeline shielded (16) with an inert gas to the injection sleeve (col. 8, lines 64-69).

Although Mercer, II et al teaches molten metal deliver to the injection sleeve, it would also have been capable of supplying to a hopper and then to the injection sleeve, wherein both concept would result in the same outcome.

Mercer, II et al teaches the above differences in order to meet the demands of rapid and consistent fabrication of high quality die cast parts (col. 3, lines 41-44).

Therefore it would have been obvious to one of ordinary skill in the art to have provide Mercer, II et al's apparatus in JP '874 and Wang et al in order to achieve rapid and consistent fabrication of high quality die cast parts.

Art Unit: 1725

***Response to Arguments***

6. Applicant's arguments with respect to claims 3, 4, 6-18, 20-35 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that none of the prior arts of record disclose the new limitation of supplying molten metal and a level sensor to detect the molten metal inside the hopper. Examiner cites two new references, US 6,135,196 (KONO) and JP 1-192447, to show the claimed features. **JP 1-192447 discloses supplying molten metal from holding furnace (1) to a hopper (3), then to the extruder for the purpose of supplying while holding the thixotropic property at low cost.**

**In addition, Kono (US 6,135,196) discloses a sensor (22) for the purpose of measuring the amount of metal inside the hopper.**

**Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide JP '447's molten metal dispensing apparatus with the sensors of Kono, in JP '874 in order to supply molten metal to the hopper while monitoring the amount of molten metal inside the hopper.**

***Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Len Tran whose telephone number is (703)605-1175. The examiner can normally be reached on M-F, 8:30 - 5.



Art Unit: 1725

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 703-308-3318. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3602.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Len Tran  
Examiner  
Art Unit 1725

LT  
December 16, 2003

Kiley Stancer A.U. 1725  
Jley Stancer 12/18/03